



FRD ACTIVITIES REPORT

July - September 2010



RESEARCH PROGRAMS

ET Probe

Due to a 1/3 cut in funding, only two Extreme Turbulence probes were deployed in the Florida Keys in July and August. One probe was deployed on a navigation light on the Atlantic Ocean side of the Keys. The second probe was installed on a navigation marker in Florida Bay. These probes have spikes on top to deter perching birds, which were a significant problem last year. So far the spikes appear to be largely successful. However, the birds have still caused problems by leaving droppings all over the solar panels used to power the probes. This is the first year in which all the deployed probes are fully self-sufficient both for power and remote communication. Cell-phone modems are used to communicate with the probes and have been largely reliable. The probes still have some hardware-reliability issues in the harsh South Florida summer environment. Future upgrades will need to focus on replacing some components that do not appear to be as robust as advertised. (Richard.Eckman@noaa.gov, Roger Carter, Tom Strong, Shane Beard, Randy Johnson)

Cheaperclipper

Four balloons plus a spare have been prepared for test launching by modifying the balloon and installing the "WISDOM sonde" environmental protection enclosure that protects the sonde from any water damage. Each balloon was inflated with helium and the net lift was monitored for 18 days to determine if there was a leak in any of the balloons. None were found to have a leak. Two balloons have also been modified to permit the insertion of the sonde inside the balloon with only the lower portion of the sonde enclosure and antenna protruding below the balloon. Several days of testing will be necessary to determine helium loss rate.

Hawaii is being considered as one of the possible test balloon launch sites but would require a different satellite and possibly necessitate taking the satellite receiver and antenna to Hawaii. We have also contacted the Charleston, North Carolina Weather Service office concerning the use of Tybee Island, Georgia or the surrounding area as a balloon launch location. Forecaster Frank Alsheimer said that this area would be a good location for the launches if we waited for the passage of a cold front, which occurs more frequently later in the year. We have decided to wait until mid-October or later when cold fronts pass on a weekly basis. They can typically forecast these events about three days in advance.

(Randy.Johnson@noaa.gov)

U.S. Historical Climatological Network – Modernization

FRD continues to assist ATDD in the daily quality control of the Historical Climate Network – Modernization (HCN-M) program. The number of HCN-M stations has now increased to 79 with 17 stations located in Alabama and 62 stations across Arizona, Colorado, New Mexico, and Utah. As part

of FRD's quality control process, a summary of instrumentation problems is submitted monthly to ATDD. Overall, the stations continue to perform rather well. (Jason.Rich@noaa.gov)

Big Southern Butte Fire Weather Research

The U.S. Forest Service (USFS) headed the Big Southern Butte field study to develop a database for testing and improving wind models in complex terrain for wild fire applications. FRD's participation in this field study began on June 2, with the deployment of 4 sonic anemometers, and terminated on September 13 when the 4 sonics were removed from service. In between, FRD participated in two intensive measurement periods during which two mobile sodars and a radar wind profiler were deployed to measure the upwind approach flow to the butte to complement the other measurements being made. These two intensive measurement periods ran from July 15-18 and August 31 to September 2. The other measurements included an array of over 50 anemometers deployed by the USFS across the butte for the entire experimental period, the standard suite of NOAA/INL mesonet measurements, plus two additional sodars and an upwind vertical sonic anemometer profile provided by the USFS and Washington State University for the intensive periods.

FRD will provide the USFS with data from the 4 sonic anemometers, 2 sodars, mobile radar wind profiler, NOAA/INL mesonet, and WRF model output covering the experimental period. Based upon a cursory examination, most of the data appear to be good except for the Radian sodar data from the first test and a period of time for the sonic anemometer that was deployed atop the butte. That was related to a bad battery and the dependence on solar power. (Dennis.Finn@noaa.gov, Shane Beard, Tom Strong, Rick Eckman, Jason Rich)

DOE Wind Forecast Improvement Study

FRD's participation in the Big Southern Butte Fire Weather Research Study proved to be a valuable opportunity to do a shakedown test of the sodars slated for use in the wind energy field studies in 2011. During the first test from July 15-18 problems were discovered in both FRD sodars. The Radian sodar was last deployed 7 years ago and it was learned that a power supply on it had failed in the interim. The Atmospheric Systems Corp. minisodar was found to have a corroded contact in its ASP unit. Both of these problems were rectified prior to the second deployment. The wind profile data now being generated by both units now appears to be a generally good and accurate portrayal of the wind. They have been redeployed to a site on the INL where their measurements can be compared with the measurements from the permanent sodar installation, permanent radar profiler, and nearby tower data to make a more rigorous assessment of the quality of the sodar measurements prior to their deployment in the upcoming wind energy studies. (Dennis.Finn@noaa.gov, Shane Beard, Tom Strong, Rick Eckman, Jason Rich)

HRRR Collaboration with ESRL

FRD is now collaborating with the Global Systems Division at ESRL on obtaining output from the High Resolution Rapid Refresh (HRRR) model. This model runs hourly with a 3 km horizontal grid spacing and provides forecasts out to 15 hours. Automated scripts have been developed to transfer a subset of the HRRR output to FRD on an hourly basis. The model forecasts are being compared with observations from the NOAA/INL Mesonet. Preliminary indications are that the model systematically underestimates peak afternoon winds in the Eastern Snake River Plain where FRD is located. (Rick.Eckman@noaa.gov)

NOAA/IDAHO NATIONAL LABORATORY (INL) METEOROLOGICAL RESEARCH PARTNERSHIP

Emergency Operations Center (EOC)

On July 23, the INL Emergency Operations Center (EOC) was activated in response to a wild fire burning in grass and sage brush on the INL. With relative humidity less than 10% and wind speeds at times exceeding 45 mph, the fire raged across the INL and surrounding areas, burning over 109,000 acres in less than 24 hours. Neil Hukari, Roger Carter, Rick Eckman, and Jason Rich represented FRD in the EOC during the activation. (Roger.Carter@noaa.gov, Rick Eckman, Jason Rich)

An EOC drill for the SMC facility was held on August 18. A chemical spill of 50 gallons of Amocor was simulated. Kirk Clawson provided meteorological data, nowcasts and forecasts during the drill and also operated the Aloha dispersion model during the drill. (Kirk.Clawson@noaa.gov)

On August 27 a new wildfire was started on the INL apparently by a failed overheated automotive part that was ejected from a passing vehicle. The winds were not as aggressive during this wildfire and the INL Fire Department and BLM firefighting crews quickly brought this fire under control. The Middle Butte Fire burned approximately 14,000 acres of the INL. Kirk Clawson represented FRD and provided short-term forecasts during the 5-hour EOC activation. (Kirk.Clawson@noaa.gov)

Also on August 27, a scheduled computer network outage on the INL threatened to disrupt the normal distribution of meteorological data to the INL Emergency Operations Center (EOC) and critical operations on the INL while the EOC was activated in response to a wildfire on the INL. Several backup systems are in place for use during such outages, but were not available due primarily to a lack of familiarity and training of the INL personnel needing to use them. This was a source of significant stress in the INL emergency response organization as we tried to assist them in accessing the backup systems. As a result of this incident, FRD has made an additional backup source of information available by upgrading our automated telephone answering system to provide all the information required by critical operations. We have also initiated a conversation with the INL organizations involved in hopes of improving the situation. (Roger.Carter@noaa.gov, Kirk Clawson)

Team A participated in an EOC drill on 22 September. The drill scenario involved a wildland fire that started near a highway on the INL. As the drill progressed, a second incident involving a leaking propane tank occurred at the ATR complex. FRD prepared short and long range weather forecasts and ran the Aloha dispersion model during the drill. (Jason.Rich@noaa.gov)

INL Hazardous Weather Alert System

The NOAA/INL Weather Center issued 15 weather alerts and statements during the last quarter. Ten of the alerts and statements were issued due to lightning. All but one of the lightning alerts/statements was issued prior to lightning striking somewhere in the INL boundaries. The other 5 alerts/statements were issued for strong winds. Four of the strong wind events were not warned on by the Pocatello NWS and the fifth event was warned after the FRD high wind alert/statement was issued. (Jason.Rich@noaa.gov)

Transport and Dispersion Modeling

Work continues on making upgrades to the implementation of HYSPLIT for EOC INL applications. The implementation of HYSPLIT for the INL EOC is dependent on access to the internet. The question thus arises: How to generate a plume map with the requisite features if the internet is down? That issue

was resolved by making additions to the arlmap file to include features that will provide useful points of reference with respect to plumes originating on the INL (roads, INL boundary, etc.). These additions represent an upgrade to the base version of arlmap and are reflected in the Postscript/PDF files that are already part of the HYSPLIT output. Therefore, the only requirement now for providing a plume map with the minimum of needed reference features when the internet is down is the existing dedicated landline between the EOC and FRD that is almost always functional. Google Maps remains the primary means of displaying the plume but it is not absolutely essential now in the event of the internet being down.

The library of potential radiological release scenarios for the INL was completed during this quarter. This effort was completed by FRD staff. However, a program for allowing EOC hazard assessment specialists to add or revise scenarios in the library without FRD intervention is in development.

Due to the large number of radio nuclides in many of the release scenarios, HYSPLIT model runtimes can be excessively long, especially for longer duration emission and tracking times. The long runtimes are potentially problematic with respect to the quick turnaround times expected in many emergency response applications. For this reason the use of the multiprocessor MPI version of HYSPLIT was investigated as a means to shorten model runtimes. It was discovered that the MPI version fails to execute successfully when the resuspension factor is non-zero for radiological release scenarios. FRD is also in the process of purchasing a new HYSPLIT computer that is significantly faster than the existing one and includes a graphics processing unit (GPU) with 448 cores that has the potential of greatly improving the performance of the model.

Drafts of the Software Quality Assurance (SQA) and User's Guide documentation for the INL EOC implementation of HYSPLIT have been mostly completed.

Brad Reese collaborated with ARL headquarters staff on developing alternate ways to display plume maps in HYSPLIT. Some of the experience gained there will be helpful when the use of kml output files is implemented in INL EOC implementation of HYSPLIT. (Dennis.Finn@noaa.gov, Brad Reese, Roger Carter, Richard Eckman)

A final report for the Advanced Test Reactor (ATR) Life Extension Program was delivered to INL in September. This report described a modeling study of plume dispersion from the ATR based on NOAA/INL Mesonet data covering five years. The large data set was used to derive frequency distributions for the concentrations at receptors surrounding the reactor. (Richard.Eckman@noaa.gov, Neil Hukari)

NOAA/INL Mesoscale Meteorological Network (Mesonet)

FRD is continuing efforts to upgrade and improve the operations of the INL mesonet. We have implemented automatic quality control functions on the mesonet computers. This automatically detects and flags some erroneous measurements and measurements from broken instruments as they are ingested into the database. We are also testing a door switch on the electronics cabinets at the towers which will indicate maintenance in progress. This condition will be detected and all measurements from the tower will be automatically flagged during maintenance. We are also updating the system documentation. (Roger.Carter@noaa.gov, Brad Reese, Jason Rich, Shane Beard, Tom Strong)

FRD has set up a new automated telephone service for the NOAA INL Mesonet. Site workers now have the ability to call the telephone number to get current weather conditions spoken to them from each of the main facilities on the INL. This recording is available 24 hours a day, 7 days a week. There have

been 208 logged calls in its first quarter of use. The highest number of calls have been for RWMC meteorological data.

INL Renewable Energy Proposal

In anticipation of the upcoming wind energy field studies, it was decided to conduct a comparison between measurements made by the sodars that will be used in those studies with measurements made by another sodar, a radar profiler, and tower anemometers on the mesonet. This began in September following the Big Southern Butte field study (above). It is being done to identify possible sodar measurement problems and quantify how well the sodar measurements agree with other observations and with each other. (Roger.Carter@noaa.gov, Dennis Finn)

Miscellaneous

Brad Reese and Dennis Finn gave the presentation “FRD Implementation of HYSPLIT for INL Emergency Operations Center Applications” for the ARL seminar for the month of September. (Brad.Reese@noaa.gov, Dennis Finn)

OTHER ACTIVITIES

Visitors

Dr. Bret Butler, Lead Scientist, Missoula Fire Laboratory, U.S. Forest Service, 10 September, for a debriefing on demobilization of the Big Southern Butte field study.

Dr. Inanc Senocak, Assistant Professor, Boise State University, 26 August, to discuss GPU’s and joint dispersion modeling interests.

Dr. Steve Fine, ARL Director, 29 September, to meet with staff, conduct an annual visit, and to discuss ongoing projects.

Papers

Finn, D., K.L. Clawson, R.G. Carter, J.D. Rich, C. Biloft, and M. Leach (2010). Analysis of Urban Atmosphere Plume Concentration Fluctuations. *Boundary-Layer Meteorol.*, 136:431-456 (doi:10.1007/s10546-010-9510-3)

Eckman, R.M. and N.F. Hukari (2010). Computation of Normalized Concentrations for the ATR Life Extension Program. FRD Technical Report, 184 pp.

Safety

In July Debbie Puccinelli, REC Industrial Hygiene with INL, completed an office ergonomics evaluation on all employees. Chairs, back rests, chair pads, and document holders were purchased to meet ergonomic needs upon employees’ request.

At the August staff meeting the employees viewed a safety video on hearing protection from the INL Library called “Can You Hear Me?”

September's staff meeting included a safety video by the Center for Disease Control & Prevention on "Preventing Hantavirus Disease."

The fence at NRF has been taken down and removed.

Training

Richard Eckman completed the Government Ethics and The Federal IT Accessibility Initiative 508 Universe required courses in August to obtain a government purchase card.

Administrative Officer, Donna Davis is in the process of obtaining her certification for Contracting Officer Technical Representatives (COTR). She completed six required course in September. Donna plans on completing the two remaining courses in October.

In September all staff members but two (Finn/Davis) were required to re-take the original Annual Security Briefing for Un-Cleared Employees, ES&H Awareness Refresher and Counterintelligence training to obtain a renewed DOE badge. Training was completed in June but incorrect training references.

Travel

Rick Eckman and Tom Strong to Florida Keys, FL, July 18-24 and August 11-14 for ET probe deployments.

Miscellaneous

Neil Hukari retired on July 31, 2010 after more than thirty years of government service. Best wishes Neil!